Homework 3

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Problem 1. *Let p be a proposition. Let Pr be a probability function such that $Pr(p) = .6$. What is $Pr(\neg p)$?*

Problem 2. *In an intergalactic competition, the Yorks and the Zorks are competing to win the championship. Exactly one of these two teams will win. The probability that the Yorks win is .75. What is the probability that the Zorks win?*

Problem 3. *In an intergalactic competition, the Orks, the Borks, and the Corks are competing to with the championship. Exactly one of these three teams will win. The Orks and the Borks are equally likely to win, but the Corks are three times as likely to win as the Borks. How likely is it that the Orks will win? How likely is it that the Borks will win? And how likely is it that the Corks will win?*

Problem 4. *In an intergalactic competition, the Alphas, the Betas, the Gammas, and the Deltas are competing to with the championship. Exactly one of these four teams will win. The Betas are half as likely to win as the Alphas. The likelihood that the Alphas win is twice as great as the likelihood that either the Gammas win or the Deltas win. The likelihood of the Deltas losing is four times as great as the likelihood of the Deltas winning. So how likely is it that the Alphas will win? How likely is it that the Betas will win? How likely is it that the Gammas will win? And how likely is it that the Deltas will win?*

Problem 5. *Let p and q be propositions, and let Pr be a probability function. Prove the following: if p entails q, then $Pr(p) = Pr(p \wedge q)$.*

Problem 6. *Let p and q be the propositions "Snow is white" and "Grass is green"; so p and q are sentence letters of proposition logic (that is, of what is called TFL in forallx). List all the atomic propositions of the algebra formed by p and q.*

Problem 7. *Consider the stochastic truth table below.*

State	p	q	$Pr(w_i)$
w_1	T	T	.2
w_2	T	F	.3
w_3	F	T	.15
w_4	F	F	.35

Use this table to answer the following questions.

1. *What is* $Pr(p)$*?*
2. *What is* $Pr(q)$*?*
3. *What is* $Pr(p \leftrightarrow q)$*?*
4. *What is* $Pr(\neg q \vee p)$*?*

Problem 8. *Assume probabilism: that is, assume that rational agents' credences ought to conform to the probability axioms. Suppose that the stochastic truth table below represents Felicia's credences in each of four possible states of the world.*

State	p	q	$Pr(w_i)$
w_1	T	T	.11
w_2	T	F	.51
w_3	F	T	.23
w_4	F	F	.15

Use this table to answer the following questions.

1. *What should Felicia's credence in* q *be?*
2. *What should Felicia's credence in* $p \leftrightarrow \neg q$ *be?*
3. *What should Felicia's credence in* $\neg p \vee q$ *be?*
4. *What should Felicia's credence in* $\neg\neg p \wedge q$ *be?*

Problem 9. *Consider the stochastic truth table below.*

World	p	q	r	$Pr(w_i)$
w_1	T	T	T	.1
w_2	T	T	F	.2
w_3	T	F	T	.05
w_4	T	F	F	.15
w_5	F	T	T	.25
w_6	F	T	F	.05
w_7	F	F	T	.15
w_8	F	F	F	.05

Use this table to answer the following questions.

1. *What is $Pr(p)$?*
2. *What is $Pr(p \vee q)$?*
3. *What is $Pr(q \vee \neg r)$?*

Problem 10. *Assume probabilism: that is, assume that rational agents' credences ought to conform to the probability axioms. Suppose that the stochastic truth table below represents Evonne's credences in each of eight possible states of the world.*

State	p	q	r	$Pr(w_i)$
w_1	T	T	T	*.2*
w_2	T	T	F	*.11*
w_3	T	F	T	*.04*
w_4	T	F	F	*.09*
w_5	F	T	T	*.12*
w_6	F	T	F	*.22*
w_7	F	F	T	*.07*
w_8	F	F	F	*.15*

Use this table to answer the following questions.

1. *What should Evonne's credence in p be?*
2. *What should Evonne's credence in $p \vee r$ be?*
3. *What should Evonne's credence in $p \leftrightarrow \neg q$ be?*